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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,074	04/19/2004	Tomoki Nobuta	WAKAB76.006AUS	1881

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EXAMINER	
WANG, EUGENIA	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
10/09/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/827,074	NOBUTA ET AL.	
	Examiner	Art Unit	
	EUGENIA WANG	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-13 and 15-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-13 and 15-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. In response to the amendment received June 11, 2008 and the supplemental amendment received July 11, 2008:

a. Claims 10 and 14 have been cancelled as per Applicant's request. Claims 21-24 have been added. Claims 11-13 and 15-18 are pending.

b. The supplemental amendment received July 11, 2008 is noted and has been entered, as it only serves to correct clerical issues within the claims.

c. The previous objection to the drawings has been withdrawn in light of the amendment.

d. The previous rejection of record has been withdrawn in light of the amendment. However, a new rejection is applied, as necessitated by the amendment.

Continued Examination Under 37 CFR 1.114

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 11, 2008 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 21-24 recite "the proton conducting organic compound," however the claims fail to specify which proton-conducting organic compound (the anode or the cathode side) is being referred to. Accordingly, it is uncertain which whether the limitation applies to the cathode proton conducting organic compound, the anode proton conducting organic compound, or both. Thus the claim is indefinite.

Note: For prosecution of the application, the interpretation that either the anode or cathode proton conducting organic compound containing the limitations read on the claim.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 11-13, 15, 18, 19, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6720109 (Takeuchi et al.) in view of JP 2000-036305 (Hara) as evidenced by Handbook of Batteries (HoB).

As to claims 11 and 15, Takeuchi et al. teach a secondary battery, wherein the reaction involves the migration of proton (thus meaning that both anode and cathode active material are proton conducting) (abs). It is noted that the positive and negative electrode active material are said to be made of

quinoxaline, which is organic (col. 1, lines14-25; formula (1) in col. 5, lines 50-55). (It is noted that within the body of Takeuchi et al., the quinoxaline is used as the negative electrode, while the positive electrode is made out of an organic polymeric materials, wherein polyindole is specifically mentioned. See col. 7, lines 40-67 and col. 8, lines 1-23.) The electrolyte is an aqueous acidic solution, most notably sulfuric acid being especially embodied (col. 8, lines 31-37).

It is noted that the electrolyte has a proton source and is proton ionizing.

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection.

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. In re Rijckaert, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993).

"In relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990)

In the case of the instant application bases for expectation of inherency can be drawn. The basis for expected inherency is that the electrolyte taught by

Takeuchi et al. is the same as one exemplified by the instant application (p 29, lines 17-20).

The Examiner invites applicant to provide that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product.

Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Takeuchi et al. do not teach that the cathode comprises of an anion-exchange resin, wherein the anion-exchange resin is fiber with a length of 10 mm or less and a major axis of 100 μm or less (as required by claims 11 and 15).

Hara teaches a lead-acid battery wherein the active material of the anode includes a sulfonated polystyrene resin (anion-exchange resin) made of fibers with a diameter (major axis) of 10 micrometers and an average length of 5 mm (abs; para 0011, lines 1-5). The motivation for wanting to include the sulfonated polystyrene resin fiber is that it can raise the conductivity in an active material layer, can raise the active material utilization factor, and raise the capacity of the cell (para 0016). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to include the sulfonated polystyrene resin (anion-exchange resin) in anode of a lead-acid

battery in order to improve conductivity, active material utilization, and capacity of the battery. (It is noted that the sulfonated polystyrene resin inherently is an anion exchange resin, wherein the basis of inherency lies in the fact that it is the same material embodied by the instant application. See p 20, lines 12-19 of the instant application.) Finally, it is noted that lead-acid batteries are secondary batteries (please refer to p 24.7 of HoB, relied upon as an evidentiary piece to show the characteristics of a lead-acid battery) (much like Takeuchi et al.). Accordingly, each electrode acts as an anode and a cathode during different states of charge and discharge. Thus, the combination of Takeuchi et al. and Hara reads on the claimed invention, because although the anode is embodied to have the fibers (Hara, para 0011), it acts as the cathode during a different state of charge/discharge (as applied to claims 11 and 15).

Although Takeuchi et al. and Hara are drawn to different battery types, they are still combinable, as they are chemically similar, and accordingly one of ordinary skill in the art would have found it obvious to combine the teaching of Hara with that of Takeuchi et al. The reasons for this are set forth below. First it is noted that Takeuchi et al. note and compare their proton-conducting secondary battery to that of a lead acid battery (abs). Accordingly, by specifically likening their organic secondary battery to that of a lead acid battery (and not to any other kind of secondary battery, i.e. lithium, alkaline, etc.), Takeuchi et al. is indicating that the two are chemically comparable. Additionally, the chemistry in the battery types can further be compared with likenesses drawn. First, both use proton migration. (See abstract of Takeuchi et al., and refer to HoB, p 24.8, lines 7-9,

the reaction of the lead acid cell.) It is noted that the HoB is used as an evidentiary piece to display the characteristics of a typical lead-acid battery.) In addition to both using proton migration, both also use the same electrolytic material, sulfuric acid. (See col. 15, lines 6-9 of Takeuchi et al. and p 24.6, lines 24-25.) Due to the chemical similarities in lead-acid batteries and the secondary battery embodied by Takeuchi et al. (the use of the same electrolyte, the use of proton conduction), as well as Takeuchi et al. bringing light that the two are specifically comparable to one another, one of ordinary skill in the art would have found it obvious to apply the teaching of Hara (embodying a lead-acid battery) to that of Takeuchi et al., wherein the addition of the anion-exchange material (as taught by Hara) to the battery of Takeuchi et al. would have yielded the predictable result of providing the same improvement (improved discharging capacity).

As to claims 12 and 18, Takeuchi et al. teach that the quinoxaline (electrode material) charges/discharges by a reaction by the insertion-release of protons (col. 3, lines 29-31). (It is noted that this is viewed as an exclusive redox reaction, wherein the basis for this is that the protons are exchanged in a reaction of charging and discharging, and thus acts in the same manner as claimed.)

As to claims 13 and 19, it is noted that in example 10, Takeuchi et al. teach a specific electrolyte used: 20 wt% aqueous solution of sulfuric acid (col. 15, lines 6-9).

As to claims 21 and 23, Takeuchi et al.'s quinoxaline (electrode material), as seen in formula 1 is organic as well as pi-conjugated (as it comprises of modified benzene rings, wherein the rings have alternating carbon-carbon single and double bonds).

5. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al., Hara, HoB, as applied to claim 15, in further view of US 5374490 (Aldecoa).

As to claim 16, Takeuchi et al., Hara, HoB do not teach of connecting electrochemical cells in series.

However, Aldecoa teaches of lead acid batteries stacked in series (fig. 4). The motivation for coupling the modules (of lead-acid cells) in series is in order to create a higher potential (col. 3, lines 32-35). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to couple the lead-acid cells in series in order to reach a higher potential. First of all, it is noted that Takeuchi et al. has been likened to lead-acid cells, as set forth in the rejection for claim 15, and thus Aldecoa is applicable. However, even if the battery types were not the same, the general teaching of Aldecoa is that batteries can be connected in series in order to create higher (desired) potentials (fig. 4; col. 3, lines 32-35). This general teaching can be applied to other batteries, wherein the application of connecting batteries in series would have yielded the predictable result of providing the system that is able to create higher potentials, as desired. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention

was made to connect the obviated battery in series, as it would have provided the predictable result of providing a battery system to yield a higher potential.

As to claim 17, Takeuchi et al., Hara, HoB do not teach of stacking the electrochemical cells (in series).

As to claims 17, Aldecoa et al. teaches that stacking the battery modules [10] effectively couples the modules in series, which in turn creates a higher potential (fig. 4; col. 3, lines 32-35). Thus, the motivation for stacking the battery modules would be to connect the modules in series, which in turn creates a higher potential. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to stack the lead-acid cells in order to effectively connect the batteries in series, thus reaching a higher potential. First of all, it is noted that Takeuchi et al. has been likened to lead-acid cells, as set forth in the rejection for claim 15, and thus Aldecoa is applicable. However, even if the battery types were not the same, the general teaching of Aldecoa is that stacked battery modules connected in series to creates higher (desired) potentials (fig. 4; col. 3, lines 32-35). This general teaching can be applied to other batteries, wherein the application of connecting batteries in stacked series (as set forth by Aldecoa) would have yielded the predictable result of providing the system that is able to create higher potentials, as desired. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to connect the obviated battery in the module taught by Aldecoa, as it would have provided the predictable result of providing a battery system to yield a higher potential.

6. Claims 22 and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Takeuchi et al., Hara, HoB, as applied to claims 11 and 15, in further view of US 2002/0058185 (Kurosaki et al.).

As to claims 22 and 24, it is noted that in Takeuchi et al. teaches positive electrode polymeric materials, wherein polyindole and its derivatives are embodied (col. 7, lines 63-67; col. 8, lines 1-13).

Takeuchi et al. does not specifically teach of the use of a pi-conjugated indole trimer compound as a proton-conducting compound.

Kurosaki et al. teach the use of indole trimers (an indole derivative) in batteries (para 0020). (It is noted that an indole trimer is pi-conjugated, as seen in formula 1 in para 0020, as indicated by the alternating carbon-carbon double and single bonds.) It is noted that Kurosaki et al. specifically embodies the use of indole trimers in the positive active material (like Takeuchi, above) (para 0034). Accordingly, it would be obvious to use an indole trimer (as taught by Kurosaki et al.) as the specific kind of indole derivative in the battery of Takeuchi et al., since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin,* 125 USPQ 416. It is noted that the use of an indole trimer as the type of an indole derivative (taught by Takeuchi et al.) would have also provided the predictable result of operating as a proton conductor. Therefore one of ordinary skill in the art at the time the invention was made would have found it obvious to use an indole trimer as the specific type of indole derivative in the battery of Takeuchi et al., as the use of that particular

indole derivative would have yielded the predictable result of functioning as the positive electrode.

Additionally, it is noted that Kurosaki et al. teach that the use of an indole trimer provides a high rate and cycle characteristic as well as sufficient electromotive force and capacity (abs). Accordingly, the motivation for using an indole trimer (as taught by Kurosaki et al.) as the type of indole derivative in the battery of Takeuchi et al., is to have a battery that has a high rate and cycle characteristic as well as sufficient electromotive force and capacity (abs). Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made use an indole timer in order to provide a positive electrode material that displays high rate and cycle characteristic as well as sufficient electromotive force and capacity.

Response to Arguments

7. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. The anticipatory rejection with respect to Hara has been withdrawn in light of the amendment to the claims, which narrows the scope of the claims with respect to the class of battery.

Applicant argues that the new limitation of an organic active material overcomes the previous rejection.

Examiner submits that now Takeuchi et al. is relied upon to teach this limitation.

However, as Hara is still used as a secondary reference, Examiner would like to address Applicant's arguments with respect to Example 1 (anion-

exchange resin on anode) and Example 11 (anion-exchange resin on cathode) in table 1 of Applicant's instant application, wherein Applicant argues that the aforementioned examples show an unexpected result over Hara's teaching.

Examiner respectfully disagrees. Applicant does not provide sufficient proof, because although Examples 1 and 11 of their own disclosure are mentioned, there is no comparison of them to Hara's battery. Furthermore, Applicant does not provide an example wherein the anion-exchange resin is only provided to the anode. Accordingly, it cannot be said for certain the true affect of the resin, as included on the anode/cathode/or both anode and cathode. Additionally, some examples embodying Applicant's invention (example 6) show similar numbers of initial, after 5000 cycles, and capacity % retention as that of the comparative example. Therefore, there is no true showing of unexpected results.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EUGENIA WANG whose telephone number is (571)272-4942. The examiner can normally be reached on 7 - 4:30 Mon. - Thurs., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregg Cantelmo/
Primary Examiner, Art Unit 1795

for

/E. W./
Examiner, Art Unit 1795